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**(54) FORMATION OF
AMORPHOUS SILICON
FILM WITH WIDE BAND
GAP**

(57) Abstract:

PURPOSE: To form the titled amorphous silicon (a-Si) film with satisfactory control efficiency in the manufacture of an a-Si film by a chemical vapor deposition (CVD) method by adding a specified amount of ammonia (deriv.) to a gaseous starting material.

CONSTITUTION: Ammonia (deriv.) represented by formula I and/or hydrazine (deriv.) represented by formula II is used. In the formulae each or R₁WR₇ is H, alkyl or aryl. A substrate is placed in a decomposition furnace, silane of higher order represented by formula III (where n is 2) such as disilane or trisilane is introduced into the furnace optionally together with an inert gas such as nitrogen, and the silane is thermally decomposed at about 250W600°C to deposit an a-Si film on the substrate. At this time, said ammonia (deriv.) and/or hydrazine (deriv.) is added to the silane by an amount satisfying relation represented by formula IV [where N is the amount of nitrogen in the ammonia (deriv.) and/or hydrazine (deriv.), and Si is the amount of silicon in the gaseous silane] to form an a-Si film with about 1.6W2.5eV band gap.

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$\frac{N}{R^2}$
 $\frac{N}{R^3}$

R^4
 $\frac{N}{R^6}$

II

R^5
 $\frac{N}{R^7}$

Significance

III

IV

$0.5 \leq N / \text{size} (\geq 1 - \alpha \text{ - risk})$

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